

APPENDICES

Introduction to Appendices

The following appendices present all electrical conductivity (EC), boron, and selenium water quality data collected by staff at the Central Valley Regional Water Quality Control Board, in the San Joaquin River and Grassland Watershed between May 1985 and September 1995. Over the extended monitoring period, a variety of laboratories provided analytical services for the study. In some cases, particularly for boron, time periods of use overlapped and detection limits varied. These laboratories, the time period they provided services, the analytical method used and the detection limit reported have been outlined in Table 1A. Monitoring locations for the Grassland Watershed are shown in Figure 1A with site identifications corresponding to those in Table 2 in the body of this report.

The majority of information presented in these appendices has been published by the Central Valley Regional Water Quality Control Board in annual water year reports (James *et al.*, 1988; Westcot *et al.*, 1989a; 1990a, and 1992a; Karkoski and Tucker, 1993a; Chilcott *et al.*, 1995a; Steensen *et al.*, 1996a; Chilcott *et al.*, 1989; Westcot *et al.*, 1990b, 1991b, and 1992b; Karkoski and Tucker, 1993b; Chilcott *et al.*, 1995b; Vargas *et al.*, 1995; and Steensen *et al.*, 1996b). Changes from the annual reports have been incorporated in these appendices, as follows.

1) Significant Figures

Due to the variety of laboratories used and assorted detection limits, the significant figures reported varied by constituent and water year. In general, pH, temperature, and boron were reported to two significant figures, EC was reported to three significant figures, and selenium was reported to two significant figures for values below 100 $\mu\text{g/l}$ and three significant figures for values above 100 $\mu\text{g/l}$. In no case, were values reported at concentrations less than the accepted detection limit even though the laboratories, may have provided the additional information as raw data.

Beginning WY 96, the following guidelines will apply to all reported data: two significant figures for pH, temperature, and boron; and three significant figures for EC and selenium, with a cutoff at the reporting detection level.

2) Selenium Detection Limits

Until June 1986, all selenium water samples were analyzed by the California Department of Water Resources, Bryte Laboratory. The selenium was analyzed by graphite furnace with hydride generation resulting in a detection limit of 1 $\mu\text{g/l}$. Since June 1986, all selenium analyses have been conducted by South Dakota State University, using a more sensitive fluorometric technique. Detection limits under the more sensitive techniques were reported at 0.2 $\mu\text{g/l}$. Additional studies to determine appropriate reporting limits, were conducted during 1995. A final report dated 29 January 1996 (Palmer, 1996), recalculated the reporting limit at 0.4 $\mu\text{g/l}$. With this new information, all selenium data previously reported below 0.4 $\mu\text{g/l}$ has been adjusted to <0.4 $\mu\text{g/l}$.

3) Special Water Quality Survey Conducted from 1 May 1991 through 27 September 1991

During the early years of the program, concern had been expressed that weekly sampling would not adequately represent conditions during critically dry-low flow periods. Because of this concern and the concern that significant water quality degradation may occur, an intensified sampling program was conducted during the irrigation season (1 May - 30 September) in WY 91. Samples from the following sites, were collected at least three days per week.

<u>Site Code</u>	<u>Site Description</u>
MER 555	Almond Drive Drain
MER 502	Charleston Drain
MER 504	Hamburg Drain
MER 505	Camp 13 Drain
MER 506	Agatha Canal
MER 510	CCID Main Canal at Russell Blvd.
MER 556	Main (Firebaugh) Drain at Russell Blvd.
MER 501	Panoche Drain
MER 552	Agatha Inlet (Mercy Springs) Drain
MER 509	Rice Drain at Mallard Road
MER 527	San Luis Canal at Hwy 152
MER 543	City Ditch
MER 521	Boundary Drain at DFG Pumps
MER 528	Salt Slough at Hereford Road
MER 531	Salt Slough at Lander Avenue
MER 542	Mud Slough (north) downstream of San Luis Drain
MER 554	Los Banos Creek at Hwy 140
MER 530	Mud Slough (north) at Newman Gun Club
MER 522	SJR at Lander Avenue
MER 538	SJR at Fremont Ford
STC 512	SJR at Hills Ferry
STC 504	SJR at Crows Landing
STC 507	SJR at Patterson
STC 511	SJR at Grayson Road
STC 510	SJR at Maze Blvd.
STC 501	SJR at Airport Way

Although the information collected from this special study is summarized in the WY 91 annual reports (Westcot, *et al.*, 1992a and 1992b), the entire data set has been included in the site appendices presented here. In many instances, the Almond Drive Drain, Charleston Drain, Agatha Canal, or other sites were dry during the study period; therefore, data may be limited.

4) Additional WY 93 information for Santa Fe Canal at Henry Miller (MER 579), San Luis Canal at Henry Miller (MER 532), and Porter-Blake Bypass (MER 548).

Although the above listed sites (MER 519, MER 532, and MER 548) were sampled during WY 93, the information collected does not appear in the WY 93 annual report (Chilcott *et al.*, 1995b). These three sites represent internal distribution points in the Grassland Watershed and may carry

either irrigation supply or drainage at any given time. The WY 93 annual report focussed on subsurface drainage inflows to the Grassland Water District, discharges from the Grassland Watershed to the San Joaquin River, and wetland water supply. Discussion of internal sites was omitted. The information collected has been presented in this summary report. Some information (Porter-Blake Bypass, 24 September through 15 October 1993) was deleted from the data base after further review of field sheets indicated that the samples were collected at the wrong location.

- 5) New Information for Mud Slough (north) upstream of the San Luis Drain (Site MER536): August 1993 through February 1995.

Although not presented in the annual water year reports prepared by staff of the Central Valley Regional Water Quality Control Board, limited water quality analyses were conducted on Mud Slough (north) upstream of the San Luis Drain from August 1993 through February 1995. That information is presented in Table D9, Appendix D, of this report.

Data for a total of 45 sites have been included in the following four Appendices. Appendix A lists the water quality information for the eight San Joaquin River sites. Appendices B, C, and D contain information for 13 inflow sites, 15 internal sites, and nine outflow sites, respectively. A list of contents is on the cover page of each appendix.

Table 1A. Laboratories, Analytical Techniques, and Detection Limits Reported for Electrical Conductivity, Boron, and Selenium: May 1985 through September 1995.

Constituent/Laboratory	Time Period	Method	Detection Limit
Electrical Conductivity			
Anlab	May 1985 - January 1988	wet chemistry	10 umhos/cm
In-house, CVRWQCB	November 1987 - September 1995	YSI 32 Conductance Meter	5.0 umhos/cm
Boron			
Anlab	May 1985 - June 1992	EPA 200.7	0.02 mg/L
	Juy 1994 - October 1994	"	"
	March 1995 - May 1995	"	"
Quality Assurance Laboratory	July 1992 - June 1994	EPA 200.7	0.01 mg/L
Twining Laboratories, Inc.	August 1994 - September 1995	EPA 200.7	0.05 mg/L
FGL Environmental	Sep-94	EPA 200.7	0.1 mg/L
Selenium			
DWR Bryte Laboratory	May 1985 - June 1986	GFAA w/hydride	1 ug/L
South Dakota State University	June 1986 - September 1995	Fluorimetric	0.4 ug/L

Figure 1A
Grassland Watershed
Monitoring Locations

